1. A multimode and multiband MIMO transceiver of W-CDMA, WLAN, and UWB communication comprising:

a MIMO-based multimode and multiband RF unit of W-CDMA, WLAN and UWB;

a W-CDMA rake and baseband processor;

a dual-mode WLAN and UWB OFDM processor;

a tri-mode interleaver;

a tri-mode coding processor;

a sharing memory bank;

a tri-mode control processor of W-CDMA, WLAN and UWB;

a multiple antenna unit including four identical antennas.

2. The multimode and multiband MIMO transceiver of W-CDMA, WLAN, and UWB communication of claim 1, wherein the W-CDMA rake and baseband processor further comprises two digital receiver filters coupled to two down samplings, a MUX, two spreaders, a despreader sequence generator, a rake receiver unit, and a descrambler coder generator.

3. The multimode and multiband MIMO transceiver of W-CDMA, WLAN, and UWB communication of claim 2, wherein said two digital receiver filters coupled to two down samplings are equivalent to two decimation filters in which have

linear phases and symmetric filter coefficients in programmable.

4. The multimode and multiband MIMO transceiver of W-CDMA, WLAN, and UWB communication of claim 1, wherein the MIMO-based multimode and multiband RF unit of W-CDMA, WLAN and UWB further comprises four analog bandpass filters, four LNA, four AGC, a sum over block, a selection switch, a W-CDMA down converter and demodulation, a WLAN down converter and demodulation, a multiband UWB down converter and demodulation, and a tri-mode A/D converter unit.

5. The multimode and multiband MIMO transceiver of W-CDMA, WLAN, and UWB communication of claim 4, wherein the tri-mode A/D converter unit further comprises:

two selection switches with three inputs and one output;

each of said two selection switches connects one input of W-CDMA, WLAN or UWB signals;

eight A/D converters with uniform frequency sampling rate and resolution;

two of said eight A/D converters for W-CDMA mode or WLAN mode;

Said eight A/D converters for UWB mode.

6. The multimode and multiband MIMO transceiver of W-CDMA, WLAN, and UWB communication of claim 1, wherein the dual-mode WLAN and UWB OFDM processor further comprises:

a WLAN digital decimation channel select filter unit;

a controllable selection switch with connecting either a WLAN input or an UWB input and producing a serial output;

a dual-mode WLAN and UWB serial-to-parallel (S/P) and Guard removing;

a dual-mode WLAN and UWB FFT and frequency-domain equalizer (FEQ);

a dual-mode parallel-to-serial (P/S) with either 64 inputs or 512 inputs in parallel and one serial output;

a multiband UWB digital receiver filter, despreading and time-domain equalizer (TEQ) unit;

three S/P and guard removing;

three FFT and FEQ;

three P/S with 512 inputs in parallel and one serial output;

a P/S with four inputs in parallel and one serial output;

a spreader; and

a user key sequence generator.

7. The multimode and multiband MIMO transceiver of W-CDMA, WLAN, and UWB communication of claim 6, wherein the dual-mode WLAN and UWB FFT and FEQ further comprises a dual-mode FFT, 500 equalizers, 500 decision detectors, 500 subtracts, an adaptive algorithm, and a WLAN/UWB mode generator.

8. The multimode and multiband MIMO transceiver of W-CDMA, WLAN, and UWB communication of claim 7, wherein said dual-mode FFT has either 1024 inputs and 500 outputs in parallel for UWB operation or 64 inputs and 64 outputs in parallel for WLAN operation.

9. The multimode and multiband MIMO transceiver of W-CDMA, WLAN, and UWB communication of claim 7, wherein said dual-mode WLAN and UWB FFT and FEQ uses the dual-mode FFT with 64 inputs and 64 outputs in parallel, 64 equalizers, 64 decision detectors, 64 subtracts, and the adaptive algorithm during WLAN operation.

10. The multimode and multiband MIMO transceiver of W-CDMA, WLAN, and UWB communication of claim 7, wherein said adaptive algorithm is a least mean square (LMS), a recursive least squares (RLS) or a constant modulus algorithm (CMA).

11. The multimode and multiband MIMO transceiver of W-CDMA, WLAN, and UWB communication of claim 6, wherein the multiband UWB digital receiver filter, despreading and TEQ unit further comprises four signal processing branches in parallel, each of said signal processing braches including two digital receiver filters coupled to two spreaders, which are used to despread input signals with two sequences from a multiband despreading generator, and the outputs of said two spreaders are multiplied by a MUX followed by a TEQ.

12. A multimode and multiband MIMO-based W-CDMA, WLAN, and UWB communication receiver comprising:

four antennas coupled to a multimode and multiband W-CDMA, WLAN and UWB RF unit;

the multimode and multiband W-CDMA, WLAN and UWB RF unit coupled to a W-CDMA rake and baseband processor, a dual-mode WLAN and UWB OFDM processor, a sharing memory bank, and a tri-mode control processor of W-CDMA, WLAN and UWB;

said W-CDMA rake and baseband processor, said dual-mode WLAN and UWB OFDM processor, said sharing memory bank, and said tri-mode control processor of W-CDMA, WLAN and UWB coupled to a tri-mode interleaver; and

the tri-mode interleaver coupled to a coding processor in which is controlled by said tri-mode control processor of W-CDMA, WLAN and UWB.

13. The multimode and multiband MIMO-based W-CDMA, WLAN, and UWB communication receiver of claim 12, wherein the multimode and multiband W-CDMA, WLAN and UWB RF unit further comprises:

four analog signal processing branches, each of said analog signal processing branches including an analog bandpass filter coupled to a LNA followed by a AGC, which are summed by a sum over a block followed by a selection switch;

said selection switch connects to a W-CDMA down converter and demodulation during a W-CDMA mode or to a WLAN down converter and demodulation during a WLAN mode or to an UWB down converter and demodulation during UWB mode; and

said W-CDMA down converter and demodulation, said WLAN down converter and demodulation, and said UWB down converter and demodulation in parallel coupled to a tri-mode A/D converter unit.

14. The multimode and multiband MIMO-based W-CDMA, WLAN, and UWB communication receiver of claim 13, wherein said each of said analog signal processing branches,

including analog bandpass filter coupled to a LNA followed by a AGC is programmable in parameters and has scalability functions.

15. The multimode and multiband MIMO-based W-CDMA, WLAN, and UWB communication receiver of claim 12, wherein the dual-mode WLAN and UWB OFDM processor further comprises:

a WLAN digital decimation channel select filter unit coupled to a selection switch followed by a WLAN signal processing branch including a dual-mode WLAN and UWB S/P and guard removing, a dual-mode WLAN and UWB FFT and FEQ, and a dual-mode P/S;

said dual-mode P/S having either 64 inputs and an output or 512 inputs and an output;

a multiband UWB digital receiver filter, despreading and TEQ unit coupled to said WLAN signal processing branch and three UWB signal processing branches that are combined by a P/S followed by a spreader supported by an user-p key generator; and

each of the said UWB signal processing branches including a S/P and guard removing coupled to a FFT and FEQ followed by a P/S.

16. An article comprising a medium storing instructions adapted to be executed to perform a method that causes a processor-based system to:

set the processor-based system in a receiver mode depending on whether received signals belong to W-CDMA, WLAN or UWB; and

set the processor-based system to perform a W-CDMA function and to turn off WLAN and UWB functions during W-CDMA mode;

set the processor-based system to perform the WLAN function and to turn off the W-CDMA and the UWB functions during WLAN mode; or

set the processor-based system to perform the UWB function and to turn off the W-CDMA and the WLAN functions during UWB mode;

17. The article of claim 16 further storing instructions that cause a processor-based system during a W-CDMA mode to:

set W-CDMA parameters for bandpass filters, LNA and AGC;

control a switch to connect with a W-CDMA down converter and demodulation;

select two A/D converters out of eight A/D converters for W-CDMA signals; and

set W-CDMA parameters for a tri-mode interleaver and a tri-mode decoding.

18. The article of claim 16 further storing instructions that cause a processor-based system during a WLAN mode to:

set WLAN parameters for bandpass filters, LNA and AGC;

control a switch to connect with a WLAN down converter and demodulation;

select two A/D converters for WLAN signals; and

set WLAN parameters for a FFT and FEQ, the tri-mode interleaver and the tri-mode decoding.

19. The article of claim 16 further storing instructions that cause a processor-based system during an UWB mode to:

set UWB parameters for bandpass filters, LNA and AGC;

control a switch to connect with a UWB down converter and demodulation;

select eight A/D converters for UWB signals; and

set UWB parameters for a FFT and FEQ, an tri-mode interleaver and a tri-mode decoding.